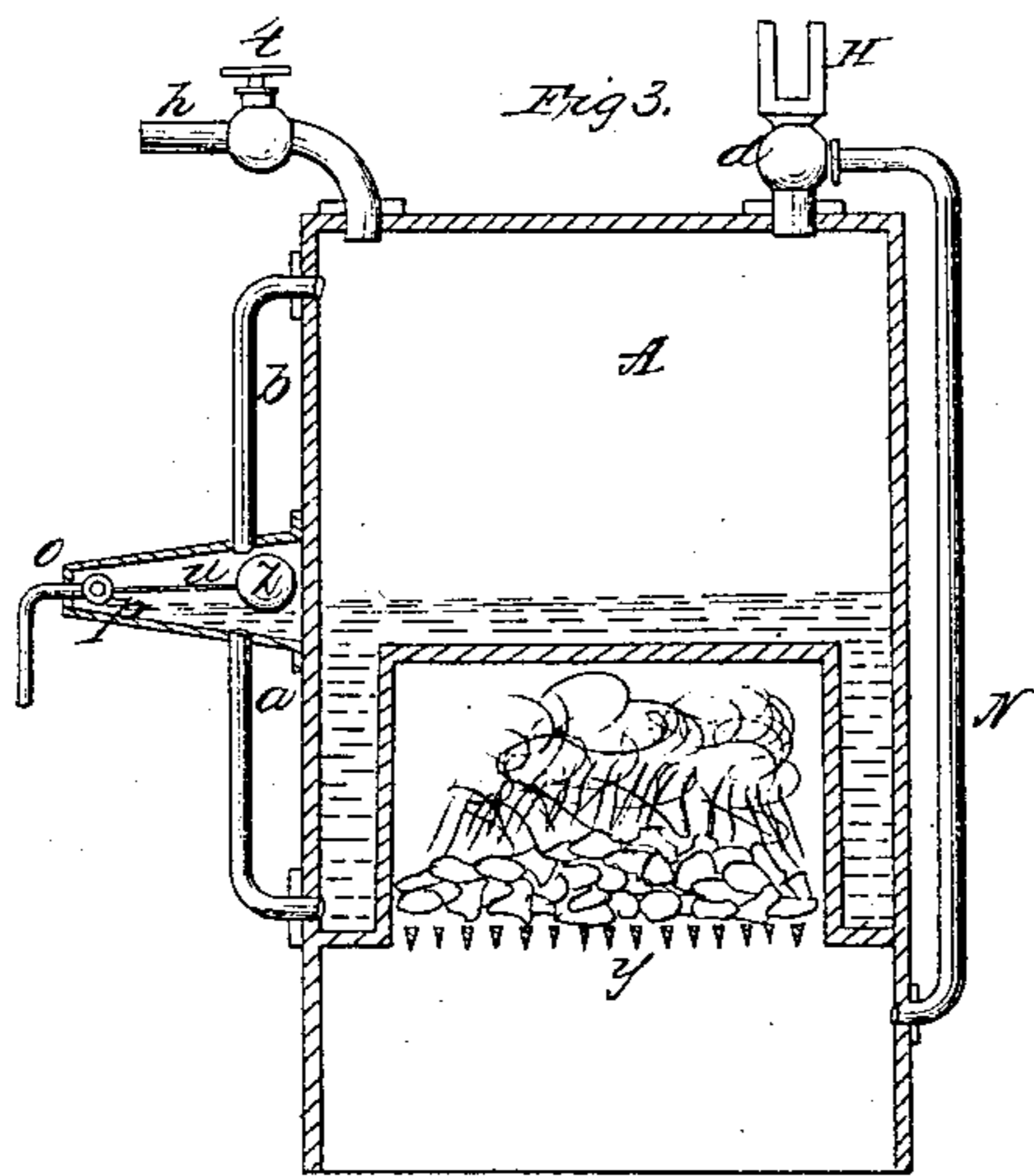
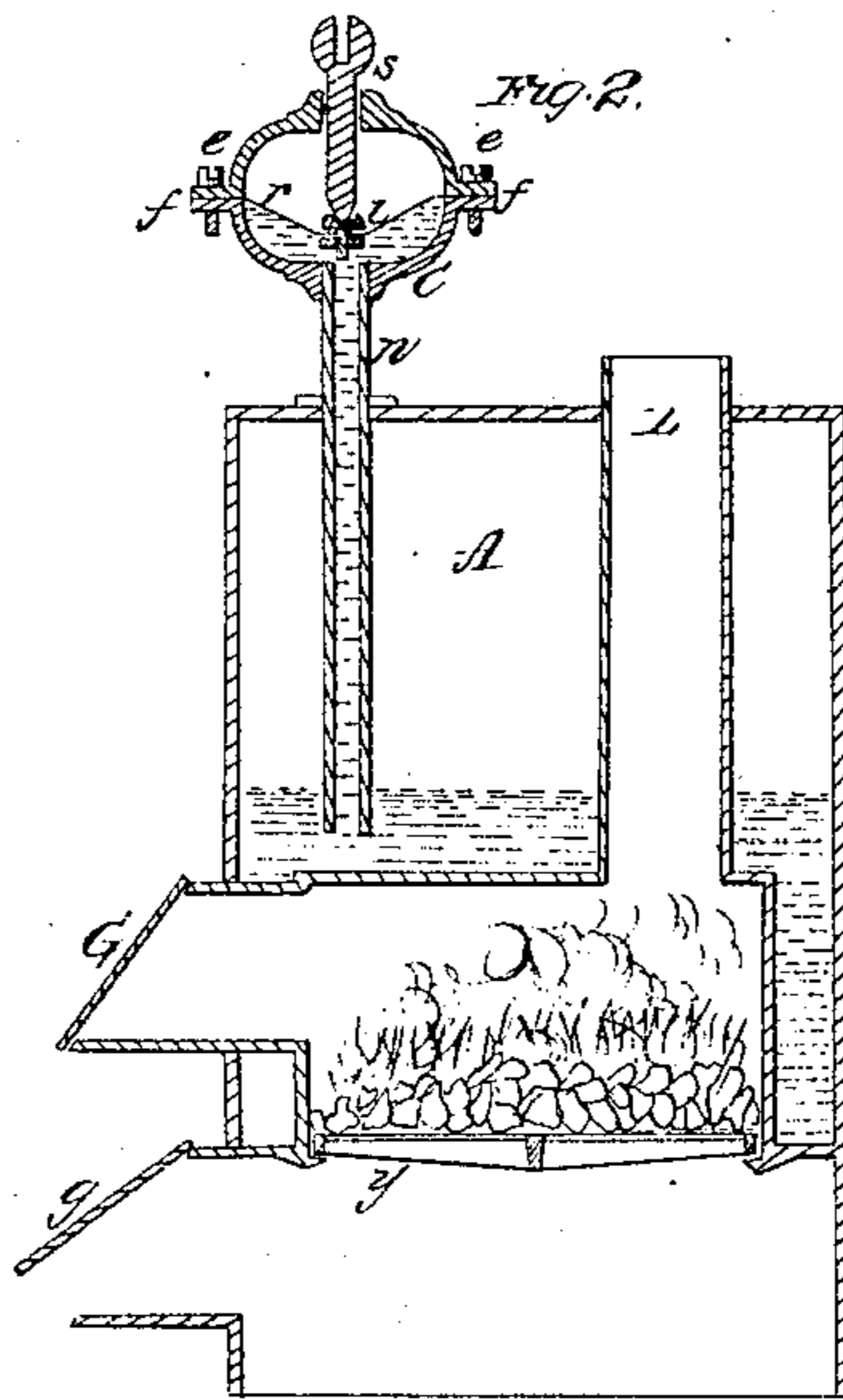
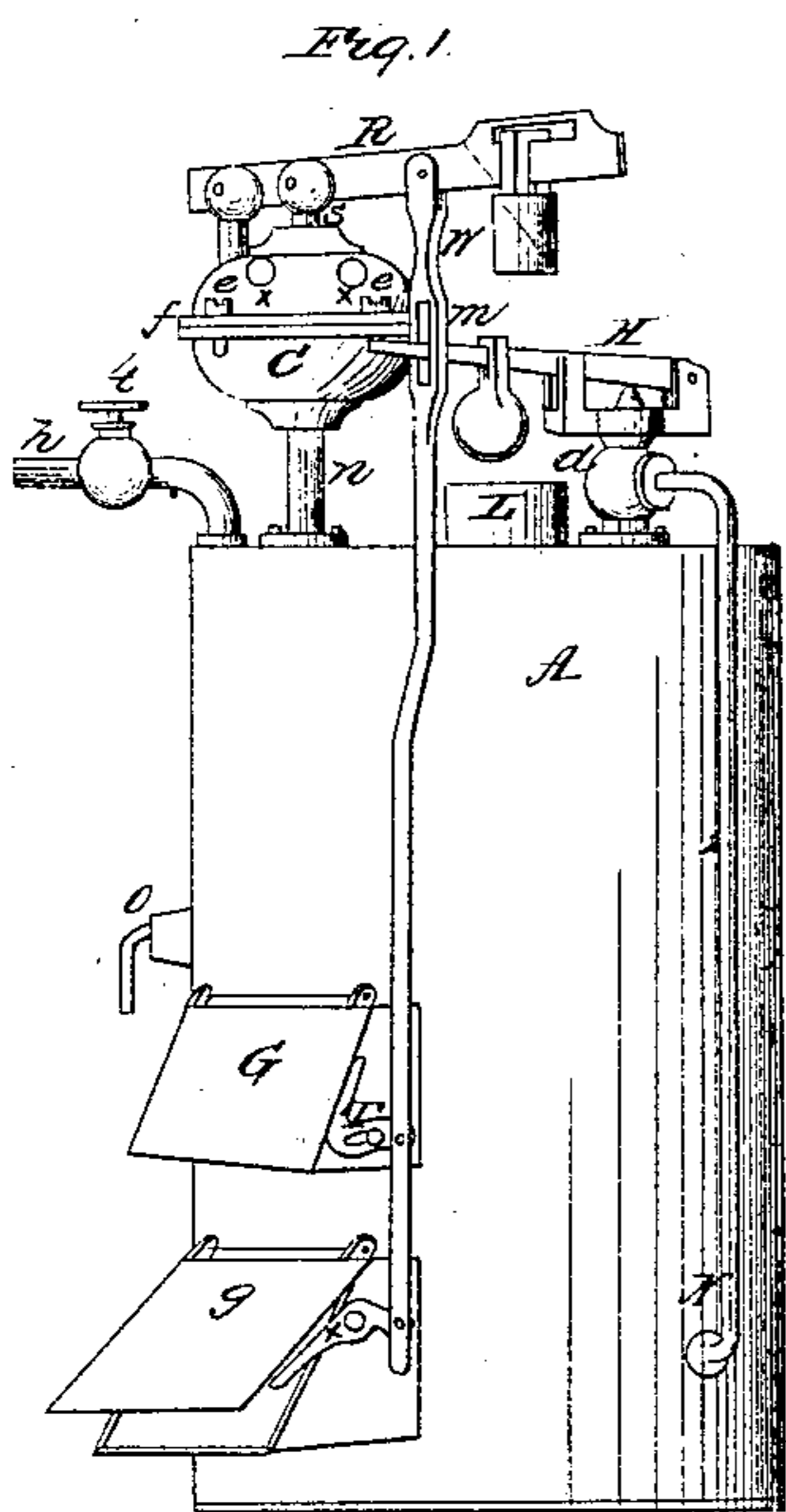


E. & J. BOURNE.
STEAM GENERATOR.

No. 37,382.

Patented Jan. 13, 1863.



Witnesses:
A. W. Ellis
H. A. Dalton

Inventors:
Edward Bourne
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UNITED STATES PATENT OFFICE.

EDWARD BOURNE AND JOHN BOURNE, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. 37,382, dated January 13, 1863.

To all whom it may concern:

Be it known that we, EDWARD BOURNE and JOHN BOURNE, of the city of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Self-Regulating Steam-Generators; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, which form part of this specification, and to the letters of reference marked thereon, in which—

Figure 1 represents a perspective view of a steam-boiler with our improvement attached. Fig. 2 is a vertical section of the same, showing the interior of the boiler and the arrangement of the doors of the fire-box and ash-pit. Fig. 3 represents a vertical section of the boiler and appendages transverse to the feed-door, and illustrates the method of supplying the water.

All the parts are lettered, and similar letters indicate like parts on all the figures.

Our invention consists of an improvement in that class of steam-generators wherein the generation of steam is regulated by opening and closing the feed and ash-pit doors automatically, so as to change and reverse the draft, causing it to pass over the fire, instead of underneath and through it, when the steam increases beyond a certain point by the varying pressure in the boiler.

The improvement we have made enables us to accomplish this in a very simple and economical manner, and for this purpose we construct our boiler of wrought-iron in any of the known forms, but prefer a vertical cylinder-boiler having the fire-box inside as being the most convenient. To this is applied the usual feed-water pipe *o*, safety-valve *d*, and the other appendages of such boilers, but in order to regulate the draft, and thereby the generation of steam, we apply to the top of the boiler *A* a hollow spherical chamber, *c*, and communicating therewith by means of a suitable pipe, *n*. This chamber is made in halves, the lower half being attached to the pipe *n* that connects it with the boiler. An elastic disk or head, *r*, Fig. 2, having a step, *l*, in its center, is placed across its mouth. The upper half is now put in position, and the whole secured together by screw-bolts *e e*, passing through the flanges

ff, formed on each half of the chamber. The step *l* in the center of the elastic head *r* is made of hard metal, and is intended to carry the stem *s*, which works loosely through a hole in the center of the upper half of the chamber. This stem is attached to a weighted lever, *R*, (the operation of which will be hereinafter described.) Secured to this lever is a rod, *W*, extending down the outside of the boiler to the feed-door *G* and ash-pit door *g*. The mouths of the furnace and ash-pit extend out some distance from the boiler. Pivoted to the sides of these extending mouths are a couple of small levers, *T* and *K*, Fig. 1, one end of which are attached to the aforesaid rod *W*. The other end of these levers act against the under sides of the doors *G g*, which are made to project over the mouths of the furnace next the levers for that purpose. Through the rod *W*, just below where it is attached to the weighted lever before mentioned, is a long slot, *m*, through which the safety-valve lever extends sufficiently far to prevent its getting out of place. This is for accomplishing that which will be described by the operation of the improvements we have made as follows: The water being conveyed to the projecting chamber *u* by means of the pipe *o*, and from thence to the boiler through another pipe, *a*, the water rises until the float *z* is lifted, when the supply is cut off by the faucet *p*, the pressure on the float being counterbalanced by the steam entering the chamber, in which it works through the small pipe *b* that enters the boiler above the water-line. Fire being placed in the furnace and steam generated, the water will ascend the pipe *n*, Fig. 2, and press against the elastic head in the spherical chamber *C*, the parts remaining stationary until it passes a given pressure, when the weighted lever *R* is raised, and by means of the rod *W* lifts the lever *T* beneath the feed-door *G* of the furnace, which opens and reverses the draft, causing it to pass over the fire, instead of underneath it. This reversal has a tendency to deaden the fire and stop the generation of steam, but in case the generation should go on, notwithstanding the reversal of the draft, the additional pressure upon the elastic head *r* will force up the weighted lever *R* until the bottom of the slot *m* in the rod *W* comes in contact with the lever *H* of the safety-valve *d*, opening said valve and allowing all excess of steam to pass off

freely through the escape-pipe N underneath the grate-bars *y*, when the fire is deadened at once, and further accumulation of steam prevented, but as soon as the pressure of the steam is gone the weighted lever R falls, closing the safety-valve, and by means of the rod W changes the position of the levers T and K operating the doors of the furnace, whereby the feed-door G is closed, and the ash-pit door *g* is opened, and a further generation of steam commenced and is carried on very rapidly as the flue L for the passage of the smoke passes up through the body of the boiler. This mode of regulating the draft is applicable to all kinds of steam-generating boilers, but is more particularly adapted to that class used for warming dwellings and for the purpose of conveying the steam to the radiators used in such cases. We apply a pipe, *h*, with the proper and necessary stop-cock *t* to the top of the boiler, and, also, to insure the falling of the weighted lever R, we make a series of holes, *x x*, through the

top of the spherical chamber C, which admits of all steam that accumulates above the thin flexible disk or head *r* to escape, and insures the free working of the parts.

Having thus described our invention, what we claim is—

1. The combination and arrangement of the short levers T and K and rod W with the elastic head *r* in the chamber C, substantially in the manner and for the purposes as herein set forth.

2. Assisting the safety-valve to rise when necessary by means of the rod W acting against the lever H that holds the valve down, for the purpose of enabling the steam to escape, as herein set forth.

EDWARD BOURNE.
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Witnesses:

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H. A. DALTON.